

THALLIUM ATTENUATION AND REMEDIATION FROM MINE WASTEWATERS

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Thallium, an element present in many mine wastewaters, presents a global environmental problem. The toxicity of thallium to humans surpasses that of mercury. The present worldwide production of thallium industrially from sulfide ore exceeds 15,500-kg/year. More than 160,000-kg/year of thallium rich ore enters lead, zinc, and copper smelting operations and an additional 140,000-kg/ year enter from iron and steel smelting. The total world mobilization of thallium is estimated to be greater than 2,000,000-kg/year. The significance of this number is emphasized when compared to the United States Environmental Protection Agency's (USEPA) drinking water regulation for Maximum Contaminant Level of 2 parts per billion. A cost effective and efficient technology for the remediation/collection of thallium is essential to prevent contamination from this pollutant. Laboratory and actual mine wastewater experimentation has been conducted in conjunction with advanced geochemical modeling. The molecular modeling studies will emphasize validation of the computer simulations by direct comparisons with experimental results. Results from this USEPA sponsored Mine Waste Treatment Project for removing thallium from wastewater will be presented. A USEPA sanctioned Quality Assurance Plan for analysis was followed using Inductively Coupled Plasma and Atomic Adsorption.